

## **PM10 Sampler Flow Audits**

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The Quality Assurance Section (QAS) conducts annual performance audits on particulate matter (PM10) samplers. The audits produce two quantitative estimates of the sampler's performance: The audit flow rate percentage difference and the design flow rate percentage difference. The audit flow rate percentage difference determines the accuracy of the sampler's indicated flow rate by comparing it with a flow rate from the audit transfer standard. The design flow rate percentage difference determines how closely the sampler's flow rate matches the inlet design flow rate under normal operating conditions. Commercially available PM10 samplers operate at an actual total flow rate of 40.0 CFM (cubic feet per minute) with a design flow rate of 36.0 to 44.0 CFM.

The PM10 sampler flow audit method involves using a certified BGI variable orifice to measure the flow through the PM10 sampler's filter inlet. The flow rate is determined by using a pressure transducer to measure the pressure drop across the orifice. The pressure drop, along with the ambient temperature and pressure readings, are used to calculate the actual flow through the orifice. The measured actual flow rate is compared to the flow rate recorded by the sampler. The audit equipment used is certified semi-annually using a National Institute of Standards and Technology (NIST) traceable roots meter.

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## **PM2.5 Sampler Flow Audits**

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The Quality Assurance Section (QAS) conducts annual performance audits on the fine particulate matter (PM2.5) samplers. The audits produce two quantitative estimates of the sampler's performance: The audit flow rate percentage difference and the design flow rate percentage difference. The audit flow rate percentage difference determines the accuracy of the sampler's indicated flow rate by comparing it with a flow rate from the audit transfer standard. The design flow rate percentage difference determines how closely the sampler's flow rate matches the inlet design flow rate under normal operating conditions. Commercially available PM2.5 samplers operate at an actual and design flow rate of 16.67 LPM (liters per minute).

The PM2.5 sampler flow rate audit method involves using a calibrated BGI DeltaCal transfer standard in the range of 0-20 LPM (liters per minute) or a Streamline Flow Transfer Standard (Chinook) in the range of 5-20 LPM. The audit devices are National Institute of Standards and Technology (NIST) traceable and the DeltaCals and Chinooks are calibrated once a year.

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## **TEOM Sampler Flow Audits**

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The Quality Assurance Section (QAS) conducts annual performance audits on the tapered element oscillating microbalance (TEOM) samplers, a continuous PM10 monitor. The audits produce a quantitative estimate of the sampler's performance: The audit flow rate percentage difference. The audit flow rate percentage difference determines the accuracy of the sampler's indicated flow rate by comparing it with a flow rate from the audit transfer standard. Commercially available TEOM samplers operate at an actual flow rate of 16.7 LPM (liters per minute) with a 3.0 LPM main flow rate and a 13.7 LPM auxiliary flow rate.

The TEOM sampler flow rate audit method involves using two calibrated transfer standard mass flow meters (MFM). One MFM is calibrated in the flow range of the total and the auxiliary flow rates, 0-30 SLPM (standard liters per minute), and the second MFM is calibrated within the range of the main flow rate, 0-5 SLPM. The audit equipment is National Institute of Standards and Technology (NIST) traceable and calibrated semi-annually with the relative standard deviation within 1.0% of the last two calibrations.

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## **BAM Sampler Flow Audits**

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The Quality Assurance Section (QAS) conducts annual performance audits on the beta attenuation monitor (BAM) samplers, a continuous PM10 or PM2.5 monitor. The audits produce a quantitative estimate of the sampler's performance: The audit flow rate percentage difference. The audit flow rate percentage difference determines the accuracy of the sampler's indicated flow rate by comparing it with a flow rate from the audit transfer standard. Commercially available BAM samplers operate at an actual flow rate of 16.7 LPM (liters per minute).

The BAM sampler flow rate audit method involves using a calibrated BGI DeltaCal transfer standard in the range of 0-20 LPM (liters per minute) or a Streamline Flow Transfer Standard (Chinook) in the range of 5-20 LPM. The audit devices are National Institute of Standards and Technology (NIST) traceable. The DeltaCals and the Chinooks are calibrated once a year.

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